FOCUS: Adding and subtracting numbers to 20 fluently

ACTIVITY TIME: 45–50 min

GROUP SIZE: Pairs

PROCESSES/COMPETENCIES: Problem Solving, Reasoning and Proving, Visualizing, Mental Mathematics and Estimation, Communicating

Four in a Line

MATERIALS
- **Student Card 34**
- **Two colours of counters (10 of each per pair)**
- **Multi-Use Card 1:** Ten-Frames
- **Master 89:** Common Doubles
- **Master 91:** *Four in a Line* Cards
- **Master 92:** *Three in a Line* Cards
- **Master 93:** *Four in a Line* Game Board (for *Combined Grades Extension*)
- **Master 94:** Assessment

Also available: (Below grade) *Buy 1–Get 1, Canada's Oldest Sport* (On grade) *Array's Bakery*

BIG IDEAS
- Quantities and numbers can be added and subtracted to determine how many or how much.
- Numbers are related in many ways.
- Patterns and relations can be represented with symbols, equations, and expressions.

ℹ INSTRUCTIONS

Before
Say: "I went shopping yesterday. I wanted to make sure I had enough money before I went to the checkout, so I tried to add the prices in my head. How would you add 9 and 3 in your head?" Write 9 + 3 on the board. As volunteers share their answers and strategies, record them on chart paper (e.g., count on 3 from 9; take one from 3 and give it to 9 to make 10; a friendly number: 9 + 3 = 10 + 2, or 12). Have students share stories about times when they used math outside of school.

What to Do (15–20 min): Use Student Card 34A
Note: Give each pair a set of cards (Master 91a) and two colours of counters. Display common doubles (Master 89). Encourage students to write number sentences in their math journals.
- Each of you choose a colour. The goal is to get four counters in a line. Place the cards face down in a pile.
- Take turns turning over a card, finding the answer, explaining how you found the answer and then placing a counter on the number.
- Continue to take turns until one of you gets four in a line.

How to Differentiate
Accommodations: Use Side B and the cards on Master 92 to get three counters in a line. Students use ten-frames and counters to help.
Extension: Students write their own addition and subtraction questions for the numbers that appear on the board, and add them to the deck.
Combined Grades Extension: Students use the game board on Master 93 and the cards on Master 91b.

🔗 CONSOLIDATION
- Bring students back together to share their strategies for adding and subtracting. Write 7 + 9 on the board. Have volunteers model how they found the answer. For example, some students may have modelled with counters on a ten-frame, some may have counted on from 7 or from 9, others may have used a known double (e.g., 7 + 9 is 2 more than 7 + 7), and some may have made 10 (e.g., 7 + 9 is the same as 6 + 10). Help students see that all strategies give the same answer but, depending on the situation, some strategies are more efficient than others.

Highlight for Students
- We can add and subtract numbers in our head.
- We can use different strategies to help us do mental math.

🔍 WHAT TO LOOK FOR
- How are students finding the answers (e.g., modelling with counters, counting on or back, using a known double, making 10 or a friendly number)?
- Do students use math language to explain the strategy they used to find the answer?
- Are students able to choose an appropriate strategy to answer each question or do they always use the same strategy?
- Are students able to answer both the addition and subtraction questions or do they struggle with subtraction?

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❓ PROBING QUESTIONS
- What strategy did you use to find the answer? Why?
- How did you find the answer? Explain.
- Did you always use the same strategy or did you use different ones? Why?
- Which strategy do you like the most? Why?

Number

Helping Students to Progress
What You Might See/Hear and Next Steps
Formative Assessment

ACTIVITY 34

GRADE 2

Adding and Subtracting Numbers to 20 Behaviours/Strategies

1 ▸ Student uses ten-frames and counters to add and subtract with quantities to 20.

"1, 2, 3, 4, 5, 6"

Next Step
Encourage student to count on or back. Ask, "How many counters are in this ten-frame?" (4) Cover the ten-frame with a piece of paper labelled 4 and have student count on from 4: 5, 6. If student is unsure of the counting sequence, provide a number line to help.

**2** ▸ Student counts on or back to add and subtract with quantities to 20.

7 + 9
"7"   "8, 9, 10, …, 14, 15, 16"

Next Step
Show student the doubles pictures. Say: "Which double picture can help you? What is 7 + 7? If you know 7 + 7 is 14, how can it help you find the answer?" Or show ten-frames with 7 and 9 counters. Ask, "How can we make this easier to count?" (e.g., move one counter to make 10) Or use **Intervention Activities 13: Making 10 and 14: Finding Doubles**.

3 ▸ Student uses ten-frames and counters to make 10 when adding and subtracting with quantities to 20.
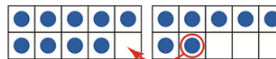
Next Step
Encourage student to visualize and find the answer before moving counters. Gradually reduce the use of materials; once student is confident, materials can be replaced with visualizations.

4 ▸ Student refers to doubles pictures when extending known sums to add and subtract with quantities to 20.

"6 + 7 = ?"

6 + 6 = 12
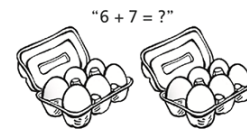
Next Step
Encourage student to play doubles games with number cubes or cards frequently, using the picture scaffolds as long as needed.

5 ▸ Student uses the same strategy in every situation when adding and subtracting with quantities to 20.

"I like to count on!"

Next Step
If student's favourite strategy is not very efficient, ask: "If you did not know (e.g., counting on), is there another way to find the answer? Tell me about it."

6 ▸ Student fluently adds with quantities to 20, but counts back by 1s to subtract.

11 − 5 = ?
"10, 9, 8, 7, 6"

Next Step
Relate using doubles to subtraction. Ask, "5 + 5 is 10, then what is 10 − 5?" Have student record the addition doubles facts and the corresponding subtraction facts. Explore subtracting 9 by subtracting 10 and giving one back and subtracting 8 by subtracting 10 and giving two back.

7 ▸ Student adds and subtracts with quantities to 20 and extends known sums and differences to solve other equations, but struggles to explain thinking.

Next Step
Prompt student with questions such as: "What strategy did you use? Did you use a double? Did you make 10? Why did you choose that strategy? How did you use the strategy to find the answer?"

8 ▸ Student fluently adds and subtracts with quantities to 20, extends known sums and differences to solve other equations, and explains thinking.

Next Step
Have student write his or her own addition and subtraction questions for the numbers that appear on the board, and add them to the deck. Or have student use the game board on Master 93 and the cards on Master 91b.

⟫ These student behaviours and strategies illustrate a progression of some of the most common misconceptions, partial concepts, and strategies students may display while learning about adding and subtracting numbers to 20 fluently, culminating with a deep understanding of the concept(s).

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